

[SHARE](#)

Tough instruments on the CCGS Amundsen

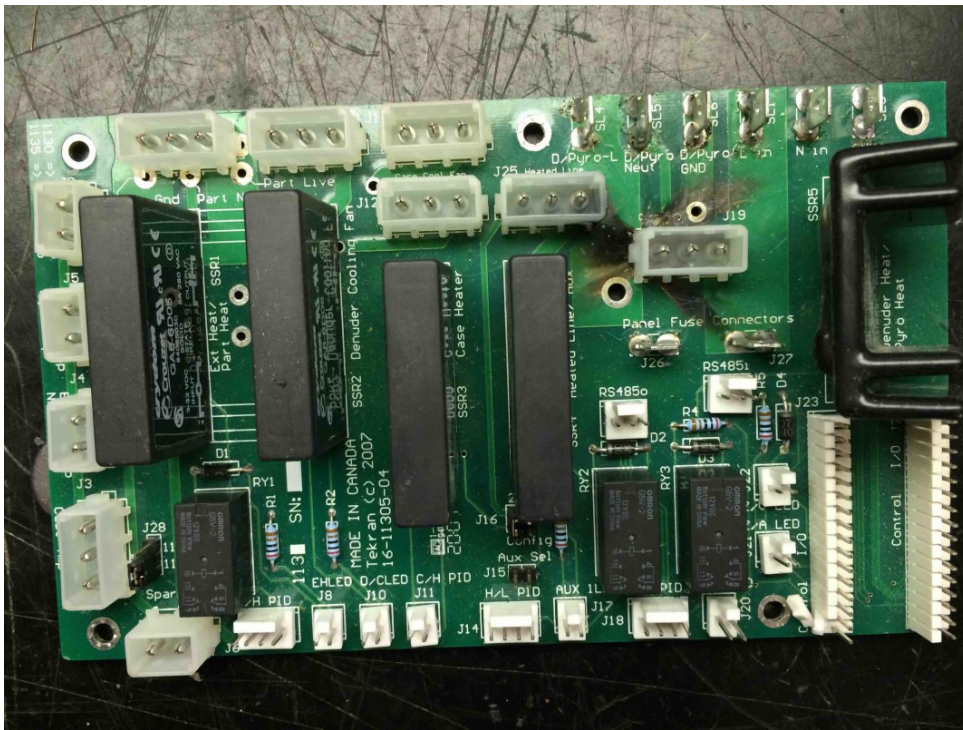
22nd September 2015

Research assistant Wen Xu had to deal with multiple technical problems when she boarded the Canadian research vessel.

I met the CCGS Amundsen at Clyde River on August 5th to replace Kathleen Munson to take over sampling seawater mercury and collecting atmospheric mercury data. I would join Kang, another PhD, for the rest of the Leg 2 and then stay on by myself during Leg 3a from Kugluktuk to Sachs Harbour.

Shortly before boarding the vessel, I was informed that seawater had inundated the sampling component of our atmospheric mercury instrument, taking it out of commission. But the instrument is tough and by adjusting the setup of the components, I was still able to collect measurements of one out of the three mercury species the instrument can collect.

Two days before I came onboard, rough seas between the Hudson Strait to the Hudson Bay attacked the two sampling units of our instrument that were set up on the front deck of the ship. After I came onboard, in addition to assisting with seawater sampling in GEOTRACES team, I used a dryer to dry out the inside part of the air instrument and try to get it up and running. When there was no apparent water or moisture inside the instrument, I thought that everything has been dried out and the component should be working fine. Unfortunately, after connecting to the pump and detector, the sampling component still would not start.



A very burnt, non-working circuit Tekran air system circuit board. Photo: Wen Xu

The electrician onboard, Thomas Linkowski, suggested that we might have more serious problems with the instrument's electronic circuit, and he helped to open the circuit. Once opened up, we could see that the electronic board was burnt. With no replacement electronic board on the ship, my backup team from Winnipeg suggested to turn run the instrument in a way in which I didn't need the burnt electronic board. Originally the instrument is designed to collect real time data for three kinds of mercury species: particulate mercury, reactive gaseous mercury and gaseous elementary mercury in the atmosphere. Running it without the board would allow the instrument to only measure gaseous elementary mercury.

Nevertheless, I am not disappointed because at least we are able to get some data from it. Our instrument is tough!

Analyzing old samples vs. taking new samples

I am lucky that before I came on the ship, Kathleen fixed all the mechanical problems of Tekran 2600, an instrument that measures total mercury concentration in the seawater. However, more problems arose. When we go to sea, we bring a solution that contains a known amount of mercury. The concentration of this solution has been tested and certified by several labs. By measuring this solution when we measure seawater, we can independently verify our mercury measurements at sea. This solution allows us to prove to other labs that our methods are reliable, so it is important that our measurements match the known concentration of this solution. However, when I ran this certified solution, the measurement from our instrument was always higher than expected. I tested all the reagents that I was using, suspecting contamination, but found none. I even borrowed pipettes from another lab to test if the problem is our pipettes. But all of these were fine. Other possibilities were that either our standard solution or certificated solution was not good, but we don't have any other ones. The only thing that I can do is to wait for my co-worker, Alexis Burt, who would come from Winnipeg during the crew change in Kugluktuk, and can bring a new standard solution and a new certificated calibration solution.

With all of these problems, my supervisor Dr. Feiyue Wang was also anxious about the refrigerator full of samples that had been collected already. He emailed saying that the priority for the rest of my stay was to finish analyzing those samples rather than collecting

new samples. Even though being on the ship costs approximately \$1000/day and I feel pressure to maximize the number of samples we collect during the cruise, it is worth taking the time to analyzing our existing samples. Since 2008, our lab has optimized our sampling and analysis method to utilize our on-site mercury laboratory. As a result, the longer those samples sit waiting for analysis, the more susceptible they are to degradation. So there was no point spending time taking more samples; I will make good use of Fei's \$1000/day with my analysis of samples!

Wen Xu was born in China. She became interested in halogen activation and mercury depletion events in the springtime Arctic when she was studying halide distribution in the Arctic region for her M. Sc. Project. After finishing her Master's degree, she is now a research assistant at Fei Wang's laboratory at the University of Manitoba.

Want to learn more about the Canadian cruise? [Read Kathleen Munson's post](#) on an unexpected diversion to the Hudson Bay.

Feature image courtesy of [Canadian Coast Guard](#)

SHARE |

Read more

19th October 2015 in Environment

Surprise visitors for the Canadian team

Live from the Arctic: Three adult polar bears circle the Amundsen and the researchers onboard reflect on the bears and their own fate in the light of climate change.

[Continue reading](#)



6th October 2015 in Environment

Diesel emission scandal comes as no surprise

Volkswagen's admission that they manipulated emission results may have shattered their share prices and crushed confidence but it was certainly no surprise.

[Continue reading](#)



[Go to News](#)

NEWS [Culture](#) [Economy](#) [Education](#) [Environment](#) [Health](#) [Politics](#) [Science](#) [Science News](#) [Sports](#) [Technology](#)

[Republishing policy](#) [Company news](#) [Follow us](#)